

## REMARKS

### SPECIFICATION

In the specification, the title at the top of page two has been amended to correct an inadvertent typographical error. The corrected title includes "SPACE-EFFICIENT" instead of "SPACED-EFFICIENT" as originally filed.

As a result of this change, the title at the top of page 2 is consistent with the title page on page 1 along with references to the title within the disclosure itself (e.g., page 2, lines 5-6; page 7, lines 19-20; page 8, lines 11-18; page 10, lines 2-3; etc.). No new matter is added.

### STATUS OF CLAIMS

Claims 1-57, 60-62, and 65-67 were previously cancelled via a preliminary amendment.

Claims 58, 63, and 68 have been amended.

Claims 70-78 have been added.

No claims have been cancelled or withdrawn.

Claims 58, 59, 63, 64, and 68-78 are currently pending in the application.

### SUMMARY OF THE REJECTIONS/OBJECTIONS

Claims 58, 63, and 68 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite. Claims 58-59, 63-64, and 68-69 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent Number 6,553,391 issued to Goldring et al. ("*Goldring*"). The rejections are respectfully traversed.

### RESPONSE TO REJECTIONS NOT BASED ON THE PRIOR ART

Claims 58, 63, and 68 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, the Office Action states: "Claims 58, 63, 58 recite the limitation 'said request to modify said new file' in lines 8, 9 and 13 respectively. There is insufficient antecedent basis for this limitation in the claim....It appears and examiner will assume for the purposes of examination that lines 8, 9, and 13 were meat to read said request to modify said current file."

The assumption of the Office Action is correct in that lines 8, 9, and 13 of Claims 58, 63, and 68 should refer to “said request to modify said current file,” not “said new file.” Claims 58, 63, and 68 are amended above to refer to “said request to modify said current file.” The Applicant respectfully submits that the amendments to Claims 58, 63, and 68 traverse the rejections of Claims 58, 63, and 68 under 35 U.S.C. § 112, second paragraph.

#### SUPPORT FOR ADDED CLAIMS

Claims 70-78 that are added via the amendment above are fully supported by the originally filed disclosure, and no new matter is added.

For example, Claims 70, 73, and 76 are supported by at least the following portions of the original disclosure: page 12, line 21 – page 14, line 10; Figure 3; and page 30, line 5 – page 31, line 14.

As another example, Claims 71, 74, and 77 are supported by at least the following portions of the original disclosure: page 12, line 21 – page 14, line 10; Figure 3; page 22, line 19 – page 23, line 20; Figures 4A-4C; and page 30, line 5 – page 31, line 14.

As a final example, Claims 72, 75, and 78 are supported by at least the following portions of the original disclosure: page 12, line 21 – page 14, line 10; Figure 3; page 14, line 22 – page 20, line 13; and page 30, line 5 – page 31, line 14.

#### RESPONSE TO REJECTIONS BASED ON THE PRIOR ART

##### A. CLAIM 58

##### (1) INTRODUCTION TO CLAIM 58

Claim 58 features:

“A computer-implemented method for modifying a ***current file associated with a file name*** comprising:  
receiving a request to modify said current file;  
creating a new file, wherein said new file is a replica of said current file  
and wherein said ***new file is associated with a file descriptor***;  
modifying said new file in response to said request to modify said current  
file, wherein said new file is only accessible by an entity that sent  
said request to modify said current file; and

linking said **file descriptor** to said **file name**, such that said new file replaces said current file. (Emphasis added.)

Thus, Claim 58 features replacing the current file with the new file by linking the **file descriptor** (that is associated with the **new file**) to the **file name** (that is associated with the **current file**). Note that Claim 58 does not feature a file name of the new file, nor does Claim 58 feature a file descriptor of the current file. Also, note that by using the different terms “file descriptor” and “file name,” the Applicant is distinguishing one from the other, and thus a “file descriptor” is not the same as a “file name,” or vice versa. The Applicant notes that while the description for the present Application refers to a “file identifier” that may be either a file descriptor or a file name (*see, e.g.*, Application, page 13, lines 16-18), that in Claim 58, the specific terms “file descriptor” and “file name” are used.

As discussed in Section VI “Modifying a File” in the Application, the approach of Claim 58 for modifying files using the “C-O-W file” technique of the Application addresses the problem of a user seeing an intermediate version of the file being modified, meaning a version of the file that includes some but not all of the changes being made. As the Application explains, in such a situation, it is preferable if the user sees either the original file or the modified file after all of the modifications are finished instead of the user seeing an intermediate version of the file that only reflects some but not all of the changes being made. (See Application, page 30, lines 5-16.)

The Application discusses two alternatives for achieving this goal: (1) copying the file to be modified/updated to a new file that is associated with a file descriptor, changing the new file, and then linking the file descriptor of the new file to the file name of the original file and (2) copying the file to be modified/updated to a new file with a new name instead of a file descriptor, changing the new file, and then renaming the new file with the original name of the original file. (See Application, page 30, lines 17-24.)

Regardless of which alternative is employed, the entity accessing the original file only sees the file under its original name and is therefore unaware that the file is being modified. Only after the new file is changed and either (1) the file descriptor of the new file is linked to the file name of the original file or (2) the file name of the new file is renamed with the original name of the original file, will a user be able to see the changed/updated file. Thus, the problem of the user accessing a file that reflects some

but not all of the changes is avoided since the user cannot access the new file as it is being modified/updated. (See Application, page 31, lines 1-11.)

Note that while the Application describes two alternatives for modifying a file as discussed above, namely (1) linking a file descriptor of the new file to the file name of the original file and (2) renaming the new file with the original name of the original file, the approach of Claim 58 is directed to the first alternative in which the file descriptor of the new file is linked to the file name of the original file, **but not** the second alternative in which the new file is renamed with the original file name. Thus, because a file descriptor is not the same thing as a file name, Claim 58 is directed to the first alternative but not the second alternative.

As a specific example from the Application (see page 17, lines 20-24), consider the “open” system call in Unix, such as the following:

```
open ("FILE-A", O_CREAT|O_RDWR)
```

that results in the creation of a new file with the name FILE-A, which can be both read from and written to. However, there is no file descriptor for this new file with the file name “FILE-A.” Rather, to have a file descriptor associated with the new file, the following system call is used (see Application, page 18, lines 1-8):

```
fd = open ("FILE-A", O_CREAT|O_RDWR)
```

which results in the new file with file name FILE-A being assigned to the file descriptor “fd.” Thus, a file name is not the same as a file descriptor, and a particular file may have a file name, a file descriptor, or both.

## (2) INTRODUCTORY DISCUSSION OF *GOLDRING*

In contrast to the approach of Claim 58, *Goldring* discloses a system and method for replicating external files and database metadata for the files between a source file system, which is linked to a source database management system (DBMS), and a target file system, which is linked to a target DBMS. (Abstract.) *Goldring*’s disclosure includes mapping file references from the source to target and only copying the most recent consistent version of files from the source to target file systems. (Abstract.)

The “references” referred to by *Goldring* are the database references to files in the associated file system, and the references include at least two elements: (1) the name of the file server on which the file is stored and (2) the name of the path to the file. (Col. 3, lines 57-67.) In describing the embodiment of Figure 2B, *Goldring* explains that if a target file already exists for a file being replicated, the newer version is copied using another name, and once the new references to the target are propagated, the newer version is renamed to have the same name as the older version. (Col. 6, lines 12-17.)

Note that in this particular embodiment, *Goldring* is manipulating file names between different versions of a file on the target file system to ultimately replace an older version of the file with the new version by renaming the new version to the old version’s file name. However, this description says nothing about the use of file descriptors, and in fact, both a reading of *Goldring* and an electronic search of *Goldring* shows that the terms “file descriptor” or even simply “descriptor” are never mentioned.

Therefore, the discussion of the embodiment of Figure 2 of *Goldring* that involves the renaming of a new file to the name of an old file to accomplish an updating of the file has the renaming function in common with the second alternative described in the Application, namely renaming the new file with the original name of the original file as described on page 30, lines 21-24. But as discussed above, this second alternative is different from the first alternative of linking a file descriptor of the new file to the file name of the original file, and Claim 58 is directed to the first alternative involving the linking of file descriptors and not the second alternative renaming file names.

### (3) THE OFFICE ACTION’S CITATIONS FROM *GOLDRING*

The Office Action states that *Goldring* discloses “creating a new file wherein said new file is a replica of said current file and wherein said new file is associated with a file descriptor (See column 5 lines 7-9).” However, the cited portion of *Goldring* states: “At block 49, since the existing DataLinks triggers the archiving of a new copy of a file every time the file reference changes, a new copy of the file is archived at block 49.” This says nothing about a file descriptor, little less that the “new copy of the file” being archived is associated with a file descriptor.

Furthermore, the Office Action also states that *Goldring* discloses “linking said file descriptor to said file name, such that said new file replaces said current file (See

column 3 lines 61-63 and column 6 lines 15-19.)” However, the first cited portion of *Goldring* is describing the “file reference” discussed above and states: “The first [element of a file reference] is the name of the file server storing the file, and the second element is the name of the path to the file.” Neither the “name of the file server storing the file,” nor the “name of the path to the file” are a “file descriptor” as in Claim 58.

The second cited portion of *Goldring* states: “...the logic renames the newer version to have the same name the older version had. In this way, if the transaction crashes it can be aborted/rolled back and the file will be reverted to the original copy.” Again, there is nothing about a “file descriptor” in this portion of *Goldring*, and as discussed above, the renaming of one file to have another older/original file name is not the same as the linking of a file descriptor of a new file to the file name of an old file.

In addition, the “file descriptor” of Claim 58 is referred to in two places that are rejected as noted above, but each of the different references to a “file descriptor” of Claim 58 is based on two different portions of *Goldring*. And in the first portion of *Goldring* relied upon in rejecting that portion of Claim 58 that includes the first occurrence of “file descriptor,” there is nothing in common with the second and third portions of *Goldring* relied upon in rejecting that portion of Claim 58 that includes the second occurrence of “file descriptor.” Thus, based on the Office Action’s citations to *Goldring*, there appears to be some confusion as to what exactly in *Goldring* is being taken to correspond to the “file descriptor” of Claim 58, since the Office Action’s citation to first portion of *Goldring* appears to be equating “file descriptor” to a “file reference,” and the second portion of *Goldring* appears to be equating “file descriptor” to a “file name.” Yet as explained above, the “file descriptor” of Claim 58 is neither a “file reference” as used in *Goldring* nor a “file name” as used in *Goldring*.

While *Goldring* discloses that the file being replicated on the target file system may be updated through the use of a new version of that file that is ultimately renamed to the file’s original name, and while this renaming operation may be viewed as being somewhat similar to the renaming technique used in the second alternative described on page 30, lines 21-24 of the Application, this disclosure in *Goldring* does not relate to use of a “file descriptor” as in the first alternative described in the Application on page 30, lines 17-21 and that is reflected in the approach of Claim 58. This indicates that *Goldring* does not disclose, teach, suggest, or in any way render obvious a “file

descriptor” that is associated with the new file and “linking said file descriptor to said file name [that is associated with the current file] such that said new file replaces said current file” as featured in Claim 58.

(4) CONCLUSION OF DISCUSSION OF CLAIM 58 AND *GOLDRING*

Because *Goldring* fails to disclose, teach, suggest, or in any way render obvious “a **current file associated with a file name**,” that “said **new file is associated with a file descriptor**,” and “linking said **file descriptor** to said **file name**, such that said new file replaces said current file” (emphasis added), the Applicant respectfully submits that, for at least the reasons stated above, Claim 58 is allowable over the art of record and is in condition for allowance.

C. CLAIMS 63 AND 68

Claims 63 and 68 contain features that are similar to those described above with respect to method Claim 58, although Claims 63 and 68 are directed to an apparatus and a computer-readable medium, respectively. Specifically, both Claims 63 and 68 feature “a **current file associated with a file name**” and “said **new file is associated with a file descriptor**.” Similarly, Claim 63 features “instructions for linking said **file descriptor** to said **file name**, such that said new file replaces said current file” and Claim 68 features “a mechanism for linking said **file descriptor** to said **file name**, such that said new file replaces said current file,” both of which are similar to “linking said **file descriptor** to said **file name**, such that said new file replaces said current file” in Claim 58.

Therefore, based on at least the reasons stated above with respect to Claim 58, the Applicant respectfully submits that Claims 63 and 68 are allowable over the art of record and are in condition for allowance.

D. CLAIMS 59, 64, 69 AND 70-78

Claims 59 and 70-72 are dependent upon Claim 58, Claims 64 and 73-75 are dependent upon Claim 63, and Claims 69 and 76-78 are dependent upon Claim 68, and thus Claims 59, 64, 69 and 70-78, and thus include each and every feature of the corresponding independent claims. Each of Claims 59, 64, 69 and 70-78 is therefore allowable for the reasons given above for Claims 58, 63, and 68. In addition, each of

Claims 59, 64, 69 and 70-78 introduces one or more additional limitations that independently render it patentable. Therefore, it is respectfully submitted that Claims 59, 64, 69 and 70-78 are allowable for the reasons given above with respect to Claims 58, 63, and 68.

In addition, Claims 70, 73, and 76 each feature that the new file is associated with “a new file descriptor,” that the current file is associated with “a current file descriptor,” and “linking said new file descriptor to said file name, such that said new file descriptor replaces said current file descriptor and said new file replaces said current file.” Thus, Claims 70, 73, and 76 feature replacing the current file with the new file by replacing the current file descriptor with the new file descriptor. Note that nothing is said in Claims 70, 73, and 76 about renaming the new file with the name of the old file, and thus the approach of Claims 70, 73, and 76 are not the same as the approach of *Goldring* discussed above in which the file being updated on the target file system is updated by renaming a new version of the file with the original name of the file.

Also, Claims 71, 74, and 77 each feature “that both said current file and said new file are associated with said plurality of data blocks,” “associating at least one additional data block with said new file in place of at least one original data block of said plurality of data blocks,” and “as a result of linking said file descriptor to said file name, said file descriptor is associated with said at least one additional data block and with said plurality of data blocks excluding said at least one original data block.” Yet *Goldring* say nothing about “data blocks,” little less that two files, such as the new file and current file of Claims 71, 74, and 77, share the same plurality of data blocks or that the current file is modified by using an additional data block whose content is based on the modification request and then having that additional data block associated with the file being modified by linking a file descriptor for the new file to the file name of the current file, as in Claims 71, 74, and 77. In fact, *Goldring* says nothing about two files sharing any of the same data blocks, as in the approach of Claim 71, 74, and 77, and a reading of *Goldring* and an electronic search of *Goldring* shows that the term “data block” is never mentioned.

Finally, Claims 72, 75, and 78 each feature the incorporation of “an operating system” that performs the functions of Claims 72, 75, and 78, yet in *Goldring*, it is the DBMS, such as DBMS 20, that employs the replication logic described therein, not an



operating system. In fact, a reading of *Goldring* and an electronic search of *Goldring* shows that an "operating system" is never mentioned.

## CONCLUSION

The Applicant believes that all issues raised in the Office Action have been addressed and that allowance of the pending claims is appropriate. After entry of the amendments, further examination on the merits is respectfully requested.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

To the extent necessary to make this reply timely filed, the Applicant petitions for an extension of time under 37 C.F.R. § 1.136.

If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,

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### CERTIFICATE OF MAILING

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on April 19, 2006 by Lisa Reynolds